

In re Patent Application of
BERNHARDT ET AL.
Serial No. 10/657,960
Filed: SEPTEMBER 9, 2003

In the Claims:

This listing of claims replaces all prior versions and listing of claims in the application.

1. (Original) A method for routing message data from a source node to a destination node in a mobile ad hoc network comprising a plurality of intermediate mobile nodes between the source node and the destination node, and a plurality of wireless communication links connecting the nodes together, the method comprising:

obtaining traffic state information about the intermediate nodes between the source node and the destination node, the traffic state information including node resource utilization information, node residual capacity information, and node transit delay information;

discovering candidate routes from the source node to the destination node, a route comprising a series of intermediate nodes and wireless communication links from the source node to the destination node; and

selecting at least one route, from among the candidate routes to distribute message data to the destination node, based upon the number of intermediate nodes and the traffic state information obtained for each of the intermediate nodes on the discovered route.

2. (Original) A method according to Claim 1 further comprising ranking the discovered candidate routes based upon the number of intermediate nodes and the traffic state

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information; wherein selecting the route is based upon the ranking.

3. (Original) A method according to Claim 2 wherein ranking the discovered routes comprises storing route entries in a route cache, each route entry corresponding to one of the discovered routes.

4. (Original) A method according to Claim 1 wherein obtaining traffic state information comprises periodic transmission of traffic state information between the nodes.

5. (Original) A method according to Claim 1 wherein obtaining traffic state information comprises requesting traffic state information from the nodes by the source node.

6. (Original) A method according to Claim 1 wherein obtaining traffic state information comprises transmission of traffic state information between the nodes in response to a network event.

7. (Original) A method according to Claim 1 wherein node resource utilization information comprises node traffic buffer utilization.

8. (Original) A method according to Claim 1 wherein node resource utilization information comprises node traffic queue utilization.

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9. (Original) A method according to Claim 1 wherein node residual capacity information comprises available node capacity beyond that being used by unrelated traffic.

10. (Original) A method according to Claim 1 wherein node transit delay information comprises a time period from when a node receives message data to transmission of the message data.

11. (Original) A method for routing message data from a source node to a destination node in a mobile ad hoc network comprising a plurality of intermediate mobile nodes between the source node and the destination node, and a plurality of wireless communication links connecting the nodes together, the method comprising:

transmitting traffic state information among the nodes, the traffic state information including node resource utilization information, node residual capacity information, and node transit delay information;

discovering candidate routes from the source node to the destination node, a route comprising a series of intermediate nodes and wireless communication links from the source node to the destination node;

ranking the discovered candidate routes based upon the traffic state information; and

selecting at least one route, from among the candidate routes to distribute message data to the destination node, based upon the ranking.

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12. (Original) A method according to Claim 11 wherein ranking the discovered routes comprises storing route entries in a route cache, each route entry corresponding to one of the discovered routes.

13. (Original) A method according to Claim 11 wherein transmitting traffic state information comprises periodic transmission of traffic state information between the nodes.

14. (Original) A method according to Claim 11 wherein transmitting traffic state information comprises requesting traffic state information from the nodes by the source node.

15. (Original) A method according to Claim 11 wherein transmitting traffic state information comprises transmission of traffic state information between the nodes in response to a network event.

16. (Original) A method according to Claim 11 wherein node resource utilization information comprises node traffic buffer utilization.

17. (Original) A method according to Claim 11 wherein node resource utilization information comprises node traffic queue utilization.

18. (Original) A method according to Claim 11 wherein node residual capacity information comprises available node capacity beyond that being used by unrelated traffic.

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19. (Original) A method according to Claim 11 wherein node transit delay information comprises a time period from when a node receives message data to transmission of the message data.

20. (Original) A mobile node for use in a mobile ad hoc network defined by a plurality of mobile nodes and a plurality of wireless communication links connecting the plurality of mobile nodes together, the mobile node comprising:
a communications device to wirelessly communicate with other nodes of the plurality of nodes via the wireless communication links; and

a controller to route communications via the communications device, the communications comprising message data, the controller comprising

a traffic state monitoring unit to obtain traffic state information about the plurality of nodes, the traffic state information including resource utilization information, residual capacity information, and transit delay information;

a route discovery unit to discover candidate routes to a destination node,

a route ranking unit to rank candidate routes based upon the number of nodes and the traffic state information of the nodes on the candidate route, and

a message data distribution unit to distribute the message data to the destination node along at least one candidate route based upon the rank.

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21. (Original) A mobile node according to Claim 20 wherein the route ranking unit stores route entries in a route cache, each route entry corresponding to one of the candidate routes.

22. (Original) A mobile node according to Claim 20 wherein the traffic state monitoring unit periodically obtains traffic state information from the nodes.

23. (Original) A mobile node according to Claim 20 wherein the traffic state monitoring unit requests traffic state information from the nodes.

24. (Original) A mobile node according to Claim 20 wherein the traffic state monitoring unit obtains traffic state information from the nodes in response to a network event.

25. (Original) A mobile node according to Claim 20 wherein node resource utilization information comprises node traffic buffer utilization.

26. (Original) A mobile node according to Claim 20 wherein node resource utilization information comprises node traffic queue utilization.

27. (Original) A mobile node according to Claim 20 wherein node residual capacity information comprises available node capacity beyond that being used by unrelated traffic.

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28. (Original) A mobile node according to Claim 20 wherein node transit delay information comprises a time period from when a node receives message data to transmission of the message data.